# DEPARTMENT OF THE AIR FORCE

OFFICE OF THE COMMANDER
HEADQUARTERS AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER
KIRTLAND AIR FORCE BASE, NEW MEXICO

1 Nov 06

MEMORANDUM FOR ALL AFOTEC PERSONNEL

FROM: AFOTEC/CC
8500 Gibson Blvd SE
Kirtland AFB NM 87117-5558

SUBJECT: AFOTEC Guidance Memorandum 99-01–Theory of Constraints - Project Management (TOC-PM)

1. The initial implementation of Theory of Constraints Project Management across AFOTEC organizations is complete. Now we have a better understanding of how AFOTEC will be using Concerto and TOC-PM to support our projects. The attached interim policy delineates the minimum mandatory policies and procedures for planning and executing projects within AFOTEC.

2. This Guidance Memorandum is in effect for 180 days pending publication of AFOTECI 99-105, Theory of Constraints - Project Management. My POC for this action is Mr. Duke Porritt, AFOTEC/CVM, DSN 263-4897.

ROBIN E. SCOTT
Major General, USAF
Commander

Attachment
AFOTEC Theory of Constraints - Project Management

**Attachment 1**

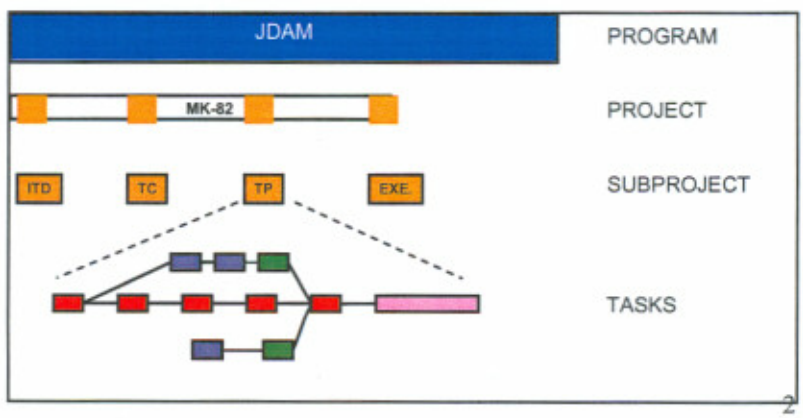
**AFOTEC THEORY OF CONSTRAINTS PROJECT MANAGEMENT**

## 1. Theory of Constraints - Project Management (TOC-PM) Overview.

1.1. **AFOTEC Project Management**. AFOTEC has implemented standardized project management best practices centerwide. These practices are designed to enhance mission accomplishment by applying proven methodologies to the execution of operational test projects. Project management directly supports AFOTEC's strategic objectives to better manage shrinking resources (personnel and dollars) and is designed to support the information needs of stakeholders across AFOTEC by providing information that can assist in communicating with stakeholders throughout the acquisition community. Project management provides a standardized methodology to support the needs of the project leads and test director (TD) in the planning, execution and control of AFOTEC projects, effectively manage organizational resources, and improve processes across AFOTEC. In order to best support AFOTEC's efforts, the TOC-PM network development process should begin as early as practical in an overall program effort.

1.2. **Theory of Constraints - Project Management**. TOC-PM is the specific methodology that AFOTEC has adopted for project management. It provides for realistic and achievable planning and execution of projects and helps decision makers apply limited resources in the most effective way to achieve project goals and meet established deadlines across all AFOTEC projects. TOC-PM is a structured and disciplined approach to business management, product delivery, and supports product improvement in AFOTEC. The theory recognizes that the most constrained (limited) resource will set the pace or schedule for all AFOTEC projects or functional processes. The constrained resource for AFOTEC may be a person, a special skill, range availability, etc. TOC-PM provides needed tools that support decision-making and includes test project and functional process networks, strategic planning, and logical analysis. Each tool considers the realities of constrained resources and their impact in the decision-making process.

1.3. **Project vs. Program.** For the purposes of AFOTEC's implementation, a project and a program are defined in the standard project management terminology. A project is defined as a temporary endeavor designed to create a unique product or service and a program is defined as a group of projects focused on addressing a common need or effort. In AFOTEC's implementation of TOC PM, programs are broken down into projects defined by the major program milestones and have established deadlines with a clear AFOTEC deliverable. Projects can then be broken down into executable subprojects. These are normally work efforts of two weeks to three months which contribute to a specific project deliverable. Subproject plans for efforts less than one week in duration should not be developed. Each



subproject is further broken down into tasks (work packages). Tasks are defined with aggressive durations, have the minimum necessary resources assigned, and should contain a checklist defining entry and exit criteria and specific actions needed to address each task. Tasks are normally one day to two week efforts but should not be less than a half a day in duration.

## 2. TOC-PM in support of AFOTEC's Test Management Processes

### 2.1. Project Initiation - Discovery and Scope/Cost

2.1.1. TOC-PM includes a number of processes used for planning and executing projects. For Discovery and Scope/Cost, these processes and associated subprojects and checklists are developed by XO and implemented upon CC approval of AFOTEC program involvement. There are four primary "subproject phases" within XO that make up the Discovery and Scope/Cost process. These are Program Initiation, Program Update, Involvement Order (IO), and Tasking Order (TO) subprojects. In Early Discovery, a program is identified as an "AFOTEC Program" when it has met the XO decision level checklist criteria. At that time, a Program Initiation subproject is loaded into CONWEB, AFOTEC's web-based project management system. Based on the status of the program, a Program Update subproject may be loaded for a given program and executed at the completion of a Program Initiation subproject. Program Update subprojects may be repeated a number of times for a given program and may be separated by as much as three months to a year until it is determined that an Involvement Decision is required. The IO subproject is then loaded and executed as the initiating phase of Scope/Cost. Once the IO is approved and posted on the MIN, XO initiates the IO-TO subproject, which identifies key events, products, and milestones required to culminate in an ITD Briefing and TO approval. Each IO to TO subproject is tailored to the specific program requirements and the TO delivery date reflected in the IO. Normally, once a subproject is implemented, the XO PM and Detachment Test Director (TD) work together to meet the TO delivery date, with an understanding that the TO date may be slipped or pushed up depending on the user needs and associated programmatics. The TO need dates are established working from key acquisition milestones backwards. Detachment subprojects are laid out to determine the time required to complete all activities needed to support the key deliverables.

2.1.2. Once the TO is approved, the respective Detachment will ensure all associated subproject templates are loaded into CONWEB. These subproject templates will cover the planning, execution, and reporting phases of each required project. CVM maintains the standardized set of AFOTEC subproject templates. These templates have been approved based on the most current AFOTEC policies and AFOTECI 99-103. In addition, these templates serve as the foundation for the development of Detachment/Evaluation Team-specific templates. Any template deviations counter to current AFOTEC policy must be authorized/coordinated through AFOTEC/XO.

2.1.3. Customization of the detachment specific templates to meet the specific needs of the test program is an essential portion of the planning process and should be accomplished before executing any project or subproject. It is critical that the final product of this process reflects reality. In order to do this, the detachment specific

subproject templates must be customized first by the detachment leadership based on the specific detachment environment and their programmatic constraints. These detachment-customized templates must then be further customized to meet the needs of the specific program they are supporting. Attempting to balance schedule, cost, and content in an environment where external constraints are a driving force, may require leadership action to reduce project scope, provide additional resources, or to influence the acquisition timeline. This customization is the key to providing a useful, quality product that the test teams and leadership can effectively use. The process of customizing the subproject templates will normally be led by the detachment test director and facilitated by a Project Management Advisor (PMA). The detachment division chief, and, when detachment policy dictates, the detachment Director of Operations, should review and approve all changes to the detachments subproject templates. This process will assist the test team in establishing baseline requirements for the project's cost, manpower requirements, content, and schedule. Resource estimates documented in the Test Resource Plan (TRP) are also formed during this phase through development of the initial test program subproject networks and are based on an early determination of major products and phases required to meet the program's goals. Subproject network variants may be developed to explore numerous cost–scope–schedule trade offs based on different test designs. During the execution of the subprojects, the TDs will need to refine the customized subproject plan to reflect any changes in the project environment and changes in the scope of the overarching program.

2.2. **Project Planning – Tasking Order to Test Readiness Review**

2.2.1. This phase is entered by the transfer of a project to a detachment via the TO. XO continues to be the AFOTEC staff lead for the program. The test team will continue detailed planning, execution, and control of the project activities. Development of more detailed test subproject networks is an essential part of this process and should be ongoing during this phase.

2.2.2. As planning proceeds, the test plan and the test's subproject plans must be updated/revised to reflect the test team's increased understanding of the test program. Standardized reports are available to assist the detachment division chiefs and the TDs by providing project resource and schedule information needed to effectively utilize limited resource across multiple subprojects.

2.2.3. Project management tools should also be used to aid leadership in viewing and analyzing multiple projects in various stages of planning and execution. Detachment or directorate-level analysis across project portfolios can provide leadership insight into potential resource or timeline constraints. Portfolio managers (division/branch chiefs) can review these reports weekly to optimize the use of their assigned resources and ensure the success of their entire portfolio of projects. Project management tools are designed to assist leaders in managing their programs; however, as a tool they require the judgment of proactive leaders to be used most effectively.

2.3. **Project Execution – Test Execution and Test Reporting Phases**. Successful project execution requires the right resources applied to the right tasks at the right time. CONWEB provides project information to the TD, test team, and leadership through concise and standardized reports that allow proactive and informed decision-making. The

TD will use this information to inform management of subproject status and to highlight required resources. The portfolio manager (normally the detachment division chief) and the TD must also have the appropriate level of delegated authority within the detachment to apply their resources assigned by the portfolio manager, to accomplish subproject activities across multiple projects. The subproject network is a powerful tool during this phase for assessing and communicating impacts of change to the project. To enable these tools to provide an accurate assessment of the test project's risk and to provide the TD and leadership with usable project analysis information, the TD will use CONWEB to assist in determining the tasks that should be worked each day based on the task level prioritization provided by CONWEB. CONWEB also provides projections of future taskings and highlights the potential impact of deviations from current subproject plans. The project's buffer status is a key tool in this process. The buffer status indicates level of risk using three zones (Green/Yellow/Red). When subproject progress indicates an increased level of risk (yellow buffer status), the TD should begin developing a (buffer) risk recovery plan. If the subproject's progress indicates a high level of risk (red buffer status) the TD will begin executing the risk (buffer) recovery plan he developed and post this plan in CONWEB. Developing a buffer recovery plan should be a TD and division chief joint effort. A portfolio manager or TD must update CONWEB daily to ensure the system accurately projects the level of project risk. In addition, the TD should use the subproject networks to support execution year budget planning, TRP updates, and spend plan development.

2.4. **Project Closeout - Test Closeout Phase**. This phase includes all activities required to complete the project with an orderly closeout process. During this process the TD is responsible for capturing schedule and resource performance data. The test subproject networks can be used to capture portions of this information as the project proceeds through each phase and at final project closeout. By archiving this information, AFOTEC, Detachments, and Directorates will have needed baseline information for future metric development and assessment.

2.5. **Lessons Learned**. Each subproject template has incorporated specific tasks designed to ensure the TD review and submit lessons learned to the MIN database. Improving AFOTEC's business processes is essential in our current environment of declining resources. The MIN Lessons Learned database is a critical tool in collecting and addressing these issues.

3. **Roles and Responsibilities.**

3.1. **XO Program Manager (XO PM).** The XO PM manages the IO to TO subproject networks with the assistance of the core team. In addition, the XO PM works closely with the TD ensuring the program-specific IO/TO subproject is kept up-to-date and on timeline to meet TO delivery date. This assistance includes developing the Initial Test Design products, staffing, multi-agency coordination, and buffer recovery planning.

3.2. **Test Director (TD).** The TD is the key to successful implementation of AFOTEC's TOC-PM processes. The TD must monitor and control project schedule, cost, scope, and quality. Effective control of a project depends on measurement of performance data against an approved baseline. CONWEB is one of the primary tools available to measure and communicate this information. Facilitated by a PMA and

assisted by test team members, the TD will customize the subproject plan to reflect both AFOTEC processes and the customized needs of the specific project. Once the subproject networks are developed, adjustments can then be made (when necessary) to keep the project on course towards achieving the objectives within the approved baseline. The detachment division chief and the TD measure project parameters such as actual cost, schedule, and work progress to identify and evaluate any risks or deviations from the overall project plan. Buffer management is a key TD role in this process. Project buffers are created during the network development process to account for anticipated project variability. AFOTEC uses a 50% buffer for all projects. As a project buffer is consumed, the level of project risk can be predicted by the rate at which the buffer is consumed. The goal is to finish all subprojects (100% complete) prior to the planned due date (100% buffer consumed). Funding expenditures are tracked against the approved budget plan and overall schedule performance is tracked through evaluation of the project buffers. Required adjustments may be applied at the subproject level within the approved baseline. The TD can use the subproject networks and CONWEB to conduct "what-if" analysis to support the decision-making process whenever changes to the approved plan are required.

3.3. **Core Team/Test Team.** The TOC-PM subproject plans and CONWEB serve as communication tools between the team members. When available, involvement of the entire team in building the subproject plans facilitates a common understanding of the test program objectives and the detailed tasks, sequence of tasks, and resources required to execute the project. During the actual execution of tasks, CONWEB will be used to ensure all team members know who should be working on what tasks and when. Team members will use CONWEB as a tool to keep up-to-date with project status and upcoming activities.

3.4. **Detachment Division Chiefs.** The division chief plays an essential role in managing projects within their division. They manage all resources and provide resources needed to support the TD's efforts. Their focus is on ensuring resources are optimally assigned based on their entire portfolio of subprojects, not just the individual projects. As such, they are the key to ensuring all the division's projects are completed on time. The division chiefs also ensure the subproject templates are used appropriately and customized when needed to meet the TD's programmatic requirements.

3.5. **Detachment Director of Operations (DO).** The DOs manage the TOC-PM efforts within the detachments. They are responsible to ensure CONWEB and TOC-PM tools are used effectively in accordance with AFOTEC policies, guidance, and standards. Working with the PMA, they must support the division chiefs and TDs by providing detachment standardized subproject templates, appropriate policies, and metrics to execute TOC-PM within their organization. They are the lead for ensuring detachments are complying with AFOTEC project management policies and guidance.

3.6. **Detachment/Directorate Leadership**. The Detachment/Directorate leadership should use CONWEB to facilitate program reviews. In addition, it is essential that they participate in the TOC-PM process by guiding and supporting the test team's efforts. This helps ensure that all subprojects are planned in accordance with the standardized AFOTEC TOC-PM processes and reflect those tasks distinctive to the Detachment or Directorate. Detachment/Directorate leadership can use CONWEB as an effective

communication tool to facilitate understanding of the program and its overall status. As such, CONWEB serves as a key tool in an organization's program review process. The subproject networks and CONWEB document resource requirements enabling leadership to support their portfolio of programs with the appropriate personnel and funding. By highlighting those resources required from outside of AFOTEC, these tools should assist the TDs in developing inputs for their Test Resource Plans. These tools, however, should never be used to justify resource requirements for AFOTEC resources. Instead, they are designed to assist leaders in managing the resources they have available to optimally execute their project portfolios. The subproject networks further serve as an agreement between the TD and key leaders responsible for managing their personnel on the duration of the program, the timeline for required resource support, and the specifics of individual activities required to ensure completion of each subproject based on project constraints and organizational resource limitations. As such, leadership must proactively review the resource requirements across their organization to ensure sufficient resources are available and trained to support their test projects. Where resources will not be available, CONWEB provides advanced warning highlighting where leadership attention may be required.

3.7. **Headquarters Management/Leadership**. In addition to providing high level review of project information, Headquarters agencies will also plan and execute their projects using CONWEB and can task or view tasks that support AFOTEC organization's subproject efforts. In these cases, support will be communicated through normal channels in addition to using CONWEB. Resource managers will then assign specific resources to required tasks. In these cases, the resource manager, or the assigned resource will need to update the CONWEB task information.

3.8. **AFOTEC/CV.** AFOTEC/CV is the AFOTEC Executive Council's agent for TOC-PM. CV has assigned responsibility for implementing TOC-PM AFOTEC-wide to the AFOTEC Project Management Office (CVM). CV is the waiver authority for deviations from the standardized methodologies and processes developed to ensure a consistent application of disciplined project management across the center. XO has been delegated a portion of this responsibility specifically for AFOTEC test projects.

3.9. **AFOTEC XO.** XO has been tasked with staffing responsibility for test projects. XO is responsible for projects up to, and including, the program closeout. XO will provide test phase-specific standardization and ensure subproject templates accurately portray the appropriate AFOTEC processes.

3.10. **AFOTEC Project Management Office (CVM).** The AFOTEC Project Management Office is tasked to aid AFOTEC in efficiently and effectively executing its mission by using disciplined project management principles and methodologies. To accomplish this, CVM will provide standardization and oversight for policies, procedures, standards, templates, and software that will be used by project managers across AFOTEC. CVM focuses on two primary areas, project team support and organizational support. Project-focused responsibilities include: providing advice/guidance to project teams and leaders, mentoring correct project management practices, and facilitating project plan development, execution, and control. Organizationally-focused responsibilities include efforts to promote best practices, establish standardized procedures, assist AFOTEC/TU in developing and providing

training, and measure and improve processes. This effort is currently administered to provide support by having a centralized project management office with a pool of individual Project Management Advisors assigned across the center based on the organizational project management workload.

3.11. **Project Management Advisors (PMA).** PMAs are the organization's TOC-PM and project management software experts. To support project management across AFOTEC, CVM will ensure a PMA is available to support each detachment and directorate executing test programs based on their workload. The PMAs are tasked to provide the TDs and staff with a source of project management expertise, software expertise, TOC-PM continuity, test team training, and assistance.

**Table 3.1 PMA Support Functions**

| | |
|---|---|
| 1 | Assisting TD with the construction, resource assignment, and analysis of project networks |
| 2 | Providing requested project management reports and information to TDs and leadership |
| 3 | Providing TOC-PM-related project management and project management software training |
| 4 | Assisting PMs, TDs, and leadership in using project management software |
| 5 | Assisting the staff with analysis of project portfolios |
| 6 | Maintaining and distributing the software tools, TP Global (master resource lists), and configuration files |
| 7 | Providing standardization of AFOTEC-wide TOC-PM methodologies and tools |
| 8 | Supporting Resource Management efforts |

## 4. TOC-PM Network Development Process.

4.1. The TOC-PM subproject networks are a critical aspect in the implementation of project management in AFOTEC. They are a key source of information supporting AFOTEC by providing both project management and resource management tools and decision support. In order to ensure that the information from across AFOTEC is usable in making AFOTEC-wide decisions, a standardized, disciplined, project management methodology has been established. The foundation of this methodology is the TOC-PM network development process. The PMAs will facilitate network development for all AFOTEC projects using the 12-Step TOC-PM Network Development Process.

**Table 4.1 The 12-Step TOC-PM Network Development Process**

| | |
|---|---|
| 1. | Clearly identify the target/objective of the project/subprojects |
| 2. | Clarify the deliverables |
| 3. | Define the constraints and success criteria |
| 4. | Starting with the appropriate standard subproject templates, walk the project team through the required tasks from finish to start identifying additional tasks and relationships and deleting unneeded ones. If a template is not available, determine a starting point for the network build that is near the end of the project and build the network backwards from that point to today using necessity logic (i.e. In order to, I must…) |
| 5. | Once complete, check the network forward in time for additional tasks and other integration points between paths by checking: "is this really needed only for that" |
| 6. | Identify the applicable resource skills needed to accomplish each task using TP Global |
| 7. | Bring in representatives from the various skill areas to check the applicable parts of the network and revise the network as needed |
| 8. | Obtain an aggressive but possible time estimate from applicable resources/resource managers for all tasks |
| 9. | Identify the Critical Chain and buffers (use 50% buffers) |
| 10. | Review and customize the network in accordance with TD and program requirements and establish the project baseline (IAW TOC PM). Deleting or reducing the buffers is not an acceptable methodology to use when trying to get a project to fit within timeline constraints. |
| 11. | Have the TD review the subproject plan with the division chief or appropriate representative and get approval for the TD's plan |
| 12. | Review and request approval for any deviations from Detachment or AFOTEC standard templates |

4.1.1. As project management matures in AFOTEC, templates will continually be refined to improve the quality of AFOTEC's products and to reduce the time needed to build a TOC-PM network; however, the 12-step process will still be followed to ensure a quality initial subproject network is produced. Once the TOC-PM subproject networks are developed and customized to meet the needs of a specific program, the detachment division chief and DO (when appropriate) must review and approve the subproject networks prior to the project lead/TD executing the plans. Detailed customization of subproject plans should occur within a few weeks (3 - 4 weeks) of subproject execution. This ensures the most current project information is used to create a usable tool for the project lead/TD and division chief.

5. **TOC-PM Training.** AFOTEC/CVM is responsible for supporting the development of project management training for key test team members, leadership and personnel resource managers across AFOTEC. CVM administers this effort in accordance with the guidance provided by the AFOTEC Executive Council (EC). To support this effort, CVM will provide project management expertise to AFOTEC/TU as they develop the project management curriculum.

6. **Staff Assistance Visit (SAV) Program.** To promote standardization of the TOC-PM processes across AFOTEC and to provide a vehicle that facilitates TOC-PM process

improvement, CVM will periodically conduct staff assistance visits of each organization. In this capacity, CVM will be promoting the incorporation of best practices developed at local organizations across AFOTEC, ensuring standardized processes are being used appropriately, and measuring organizational project management maturity. These visits are an opportunity for units to gain assistance from CVM in addressing organization-specific challenges and provide leadership with an unbiased review of their unit's progress in implementing appropriate project management best practices. Normally these visits will be conducted annually, but any commander/director can request an out-of-cycle visit based on their perceptions of the level of project management success they are achieving in their organization. The SAV program goals will be based upon specific areas of emphasis highlighted by the AFOTEC Executive Council (EC), and individually by CC, and XO. While the SAV program is not a "compliance evaluation", the SAV will look at how the units are implementing the policies delineated in this guidance, and the project management policies developed by AFOTEC EC, CC, and XO. If additional areas of emphasis are added to the SAV, the supporting SAV criteria will be transmitted across AFOTEC prior to each SAV cycle. CVM will provide a SAV out-brief to the unit leadership, XO and to CV following each SAV.

7. **Project Management Advisory Group (PMAG).** The PMAG is one of the tools used to communicate, coordinate, standardize, and provide direction to AFOTEC-wide TOC-PM implementation efforts. The PMAG will meet periodically to address organizational project management implementation issues. The membership of the PMAG will vary depending upon the issues being addressed. As a minimum, the PMAG will include members of the AFOTEC/CVM, all assigned unit PMAs, and leadership representatives from each organization implementing TOC-PM (normally the unit Deputy or Director of Operations).

8. **Configuration Standardization.** Configuration standardization and control is a critical part of implementing project management in AFOTEC. CVM will ensure that information required by AFOTEC-wide leaders is provided in a universally understood manner using compatible practices and procedures. These standardized tools and practices include a common software package, an AFOTEC-wide master configuration, an AFOTEC-wide master resource listing and skills definitions, a common project network development process, a common training program which establishes minimum project management training requirements, a standardized set of subproject templates, and standardized guidelines for subproject activities.

9. **Deviations from this Policy.** Prior to deviating from this policy, approval must be granted by AFOTEC/CV. To obtain a waiver, please provide information explaining the rationale for the requested deviation, specifics detailing the requested deviation, and the projects that will fall under the requested deviation. Recognizing the short timeline a number of our projects are subject to, AFOTEC/CVM will make every effort to expedite the approval process. Recommendations for improvements and changes to AFOTEC's project management implementation can be made through the unit PMA, XO, CVM, the AFOTEC EC, or by using the AFOTEC Product Improvement Process (input available under Plans and Policy on the Management Information Network).